

**REMARKS**

This amendment is filed in response to the final Office Action dated November 1, 2006. In view of this amendment, this amendment should be entered, the application allowed, and the case passed to issue. This amendment clearly places the application in condition for allowance, and no new matter is introduced. The amendment to claim 1 is supported by originally filed claim 2. Originally filed claim 11 supports the amendment to claim 10. Amended claim 14 is supported by claim 10

Claims 1, 3-10, and 12-17 are pending in this application. Claims 1-17 are rejected. Claims 1, 10, and 14 have been amended in this response. Claims 2 and 11 have been canceled in this response.

***Claim Rejections Under 35 U.S.C. § 112***

Claim 14 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because the word "forming" should be inserted before "sufficient hydrogen." This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

It is believed that claim 14 is definite to one of ordinary skill in this art. However, in order to advance the prosecution in this application, claim 14 has been amended in accordance with the Examiner's recommendation to overcome the asserted informality.

***Allowable Subject Matter***

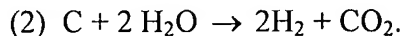
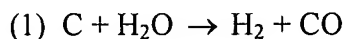
Claim 14 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112 and to include the limitations of the base claim.

Applicants gratefully acknowledge the indication of allowable subject matter. In accordance with the Examiner's recommendation, claim 14 has been rewritten in independent form and to overcome the asserted indefiniteness rejection.

*Claim Rejections Under 35 U.S.C. § 103*

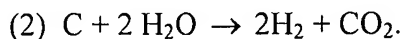
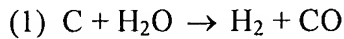
Claims 1-3 and 9-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Seaba et al. (U.S. Pat. Pub. No. 2004/0079031) in view of Kupe et al. (U.S. Pat. Pub. No. 2004/0098977) and in view of Lenglet et al. (U.S. Pat. Pub. No. 2002/0106538). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the invention, as claimed, and the cited prior art.

An aspect of the invention, per claim 1, is a fuel processing system for reforming a hydrocarbon fuel characterized by a first vaporization zone for receiving a hydrocarbon fuel and combining it with air or water. A reformer in fluid connection with and down stream of the first vaporization zone receives the hydrocarbon fuel combined with either air or water to reform the fuel to a reformat stream, which contains a hydrogen rich atmosphere. A second vaporization zone in fluid connection with the reformer is capable of receiving the reformat stream from the reformer. A water inlet connected to the second vaporization zone is capable of introducing water to the reformat stream. A filter in fluid connection with and down stream of the second vaporization zone is capable of preventing a substantial portion of any soot contained in the reformat stream from passing therethrough. The system is adapted to introduce water and air to the second vaporization zone to oxidize any soot collected on the filter in the hydrogen atmosphere of the reformat stream by reactions of the following formulas (1) and/or (2):



Another aspect of the invention, per claim 10, is a process for removing soot in a reformat stream that has been collected on a filter. The process comprises combining a hydrocarbon fuel with air to form a hydrocarbon fuel-air mixture. The mixture is reformed to a

reformate stream, which contains a hydrogen rich atmosphere. The reformate stream is passed through a filter to collect any soot in the reformate stream on the filter. When a predetermined amount of soot has collected on the filter, at least water and air are introduced to the reformate stream for a set period of time during the reforming of the hydrocarbon fuel in sufficient quantity to oxidize the soot collected on the filter by reactions of the following formulas (1) and/or (2):



The Examiner asserted that Seaba et al. teach a fuel reforming system/apparatus and method (Fig. 1) comprising a first vaporization zone (22), reformer (34), and second vaporization zone (38). The Examiner acknowledged that Seaba et al. fail to show a filter in fluid connection with and down stream of the second vaporization zone which is capable of preventing a substantial portion of any soot contained in the reformate stream from passing therethrough, and wherein the system is adapted to oxidize any soot collected on the filter in the hydrogen atmosphere of the reformate stream. The Examiner averred that Kupe et al. teach an apparatus for regenerating a particulates filter comprising a reformer and a soot/particulates filter downstream of a vaporization zone/heat exchanger. The Examiner maintained that it would have been obvious to include a soot filter downstream of the second vaporization zone of the Seaba et al. apparatus to trap soot and prevent it from exiting the tailpipe. The Examiner alleged that Lenglet et al. teach an apparatus for partial oxidation of hydrocarbons wherein a mixture of air and water vapor are fed into partial oxidation effluent (6) upstream a filter (7) to burn soot.

The combination of Seaba et al., Kupe et al., and Lenglet et al. does not suggest the claimed fuel processing system and process for removing soot in a reformate stream. Amended claims 1 and 10 require that water and air are introduced to the reformate stream. As described in the present

specification at paragraph [37] introducing air generates an exothermic reaction. In Seaba et al. water is added to the syn-gas at the heat exchanger (38) **in order to cool the syn-gas** to approximately 450 °C (see para. [0026]). At page 4, lines 16-20 of the final Office Action, the Examiner alleged that the water inlet to the second vaporization zone (38) could be adapted to introduce air as well in order to further cool the syn-gas. However, if air is introduced to the syn-gas an exothermic reaction occurs, whereby the syn-gas is heated. This is contradictory to the Examiner's asserted motivation of cooling the syn-gas. One of skill in this art would not have been motivated to introduce water **and air** into the syn-gas, as asserted by the Examiner. Thus, there is no motivation to combine Lenglet et al. with Seaba et al. and Kupe et al.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). There is no suggestion in Seaba et al., Kupe et al., or Lenglet et al. to modify the fuel processing system and process for removing soot of Seaba et al. and Kupe et al. to provide a fuel processing system adapted to introduce water and air to the second vaporization zone to oxidize any soot collected on the filter in the hydrogen atmosphere of the reformat stream, as required by claim 1, or to provide a process wherein, when a predetermined amount of soot has collected on the filter, at least water and air is introduced to the reformat stream, as required by claim 10.

The only teaching of the claimed fuel processing system and process for removing soot in a reformat stream is found in Applicant's disclosure. However, the teaching or suggestion to

make a claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claims 4-8 and 15-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Seaba et al. in view of Kupe et al. and Lenglet et al. and further in view of Smaling (U.S. Pat. Pub. No. 2003/0200742). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The combination of Seaba et al., Kupe et al., Lenglet et al., and Smaling does not suggest the claimed fuel processing system and process for removing soot in a reformat stream because Smaling does not cure the deficiencies of Seaba et al., Kupe et al., and Lenglet et al. Smaling does not suggest that the system is adapted to introduce water and air to the second vaporization zone to oxidize any soot collected on the filter in the hydrogen atmosphere of the reformat stream, as required by claim 1; or that when a predetermined amount of soot has collected on the filter, at least water and air is introduced to the reformat stream, as required by claim 10. Thus, claims 4-8 and 15-17 are allowable for at least the same reasons as claims 1 and 10, respectively.

The dependent claims are allowable for at least the same reasons as the independent claims from which they depend and further distinguish the claimed system and process.

In view of the above remarks, Applicants that this amendment should be entered, the application allowed, and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

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including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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